

REMARKS**Status of the Claims**

Claims 122-143 are under examination and were rejected.

Claim 135 was amended to correct its dependency, so it finds antecedent basis in claim 134. Claim 136 was amended to enhance clarity.

New claims 144 and 145 recite using a 'magnetic film'. This is supported, for example, in paragraphs [0086], [0189], and [0266].

The amendments add no new matter. Entry of the amendments and reconsideration in view of the following remarks are respectfully requested.

Rejections under 35 U.S.C. § 112

Claim 136 was rejected as allegedly indefinite because the Examiner asserted "it is not clear what is the 'moiety-microdevice complex'. Please specify and clarify."

Claim 136 has been amended to replace the term in question with a description of the microdevice when coupled to a moiety to be manipulated, which is what the term 'moiety-microdevice complex' refers to. Support for this is found in, e.g., paragraphs [0075]-[0076] of the application as published (2002/0137059). The amendment thus adds no new matter. This is believed to overcome the instant rejection.

In addition, claim 122 was apparently rejected (the summary was not clear with regard to this point, but the text states a rejection of claim 122), because the term "patterned magnetic material" is allegedly not clear. According to the Examiner, it is not clear whether this feature is related to the photorecognizable identification. Additionally, the Examiner says it is "not clear what is the 'encoding feature' recited in claims 125, 140-141 in relation to the usage of magnetic force for further identification purpose."

The Applicant traverses this rejection.

Here is the text of claim 122:

A microdevice, which microdevice comprises:

- a) a substrate;
- b) a photorecognizable coding pattern on said substrate; and
- c) a binding partner on a surface of the microdevice that is capable of binding to a

moiety to be manipulated,

wherein said photorecognizable coding pattern comprises a hole not penetrating through the entire depth of said substrate,

and said microdevice has dimensions from about 1 to about 500 microns, and does not comprise an anodized metal surface layer;

wherein the substrate comprises a silicon layer and a metal layer;

and the metal layer comprises a patterned magnetic material.

The claim requires a substrate, comprising a silicon layer and a metal layer. The substrate comprises a photorecognizable coding pattern. This photorecognizable coding pattern includes a hole that does not go through the substrate, ergo it does not necessarily affect the metal layer of the substrate. A plain reading of the claim thus shows that this photorecognizable coding pattern does not necessarily include or relate to the metal layer.

The metal layer comprises a patterned magnetic material. Because this is a separately recited feature, it must exist in addition to a photorecognizable coding pattern; and because it is a separately recited feature, it need not bear any relation to the photorecognizable coding pattern. They are distinct features with distinctive names, having only the word 'pattern' in common. The patterned magnetic material could provide a photorecognizable coding pattern, but the photorecognizable coding pattern could also be entirely separate.

The Examiner indicates that it was not considered clear whether the patterned magnetic material "is also 'photorecognizable'." That question is irrelevant, though: the pattern of the

‘patterned magnetic material’ may or may not be visible, depending upon the other features of the device, so it may or may not function as a photorecognizable pattern. Regardless, the ‘patterned magnetic material’ is a specified feature of the claimed device, so a ‘photorecognizable coding pattern’ must be present along with a patterned magnetic material, and the latter element serves a different function that does not *require* photorecognizability. The claim does not require a second photorecognizable pattern, so the patterned magnetic material need not be photorecognizable. There is thus believed to be no basis to argue that the term is indefinite, and any question of whether the pattern of the patterned magnetic material is ‘photorecognizable’ is not relevant, because the claim requires a feature in the substrate that is photorecognizable.

Claim 125 refers to embodiments of the device of claim 122 where the patterned magnetic material can be visible and thus can function as an encoding feature. Claims 140 and 141 further illustrate that the photorecognizable coding pattern and the ‘patterned magnetic material’ are distinct, as they can be in separate layers. Thus in certain embodiments, the patterned magnetic material may provide a photorecognizable coding feature in addition to the specifically recited ‘photorecognizable coding pattern’ of claim 122. However, the patterned magnetic material functions for its intended purpose regardless of whether it is visible—e.g., the patterned magnetic material can be covered by a layer of other material that need not be transparent, and it still functions for magnetic manipulation purposes.

Rejections under 35 U.S.C. § 103

Claims 133-35 and 138-39 were rejected as allegedly obvious based on Kaye et al. in view of Wu, Hasegawa, Hungerford, and Kauver.

Kaye does not disclose or use a magnetic material, which the Examiner has acknowledged. The Examiner took the position that incorporating a magnetic material would have been obvious based on Wu. Wu, according to the Examiner, teaches “immobilizing binding partner capable of being manipulated on the beads having magnetic materials...” The Examiner also

opined that “It is known and common practice in the art using magnetic means for detection [sic] analyte.”

The Applicant respectfully points out that Wu seems to describe only ‘magnetic beads’, not a microdevice comprising a layer of metal. Conventional magnetic beads are generally spherical structures; putting a photorecognizable encoding feature on such beads would be complicated by their shape, as the pattern would not necessarily be visible, depending upon the orientation of the bead. The typical beads would not have a controlled orientation to ensure that the code would be visible when viewed at any given position or orientation. Moreover, such beads generally comprise a metal oxide rather than a metal layer, and it has no particular form or structure—its shape does not contribute to its behavior. The metal oxide provides magnetic attractive forces, but does not provide the advantages of the patterned magnetic material of the claimed device.

The claimed device, having a layer of metal that is magnetic, rather than a magnetic bead, assists in orienting the microdevice for easy reading of the photorecognizable encoding pattern. Figures 6-9 illustrate this advantage of the claimed device, showing how the microdevices having patterned magnetic material orient when exposed to a magnetic field. Thus combining a photorecognizable coding pattern with a patterned magnetic metal layer provides a result not achieved or even suggested by the prior art. Magnetic beads from Wu would not have enabled controlled orientation of the microdevice so that the photorecognizable encoding pattern could be read. Since Wu appears to use only beads, modifying Kaye’s disclosure to use magnetic beads from Wu would not have disclosed or suggested the device as claimed, having a layer of metal. Kaye actually discloses use of beads, as depicted in Figures 7a-7c, where a bead is linked to a separate labeled tag. Using a magnetic bead in that fashion would not control the orientation of the tag, because the magnetic bead would not provide a preferred orientation; plus its implementation as shown requires constructing two separate structures and linking them together, while the present invention does not. Thus the combination of Wu and Kaye would not have disclosed or suggested the patterned magnetic films in the current claims or enabled microdevices where magnetic forces can orient the microdevice for reading of the photorecognizable encoding patterns.

The Examiner also took the position that using magnetic material was 'known and common practice.' The Applicants respectfully assert that this must be established by citing prior art, to avoid inevitable hindsight bias. Wu is the only reference cited for use of a magnetic material in this general context, and it discloses only simple magnetic beads: it clearly fails to disclose or suggest the invention as claimed. Kaye was not shown to use magnetic forces to manipulate its devices, as acknowledged by the Examiner. Combining the bead from Wu with the bead-tagging materials used in Kaye would not have produced the claimed device, which possesses the nonobvious advantage of having a preferred orientation by virtue of the patterned magnetic metal layer, which simplifies reading the photorecognizable coding pattern. Thus the general concept of using magnetic forces on a bead does not disclose or suggest the invention as claimed, and combining Wu with Kaye does not disclose or suggest the present invention, either. Accordingly, the obviousness rejection should be withdrawn.

Additional references Kauver and Hungerford were also cited in the obviousness rejection, but not for the use of a magnetic material in the context of a microdevice, thus they fail to overcome the deficiencies of Kaye and Wu. No combination of these references suggests a microdevice having a photorecognizable coding pattern or a layer of patterned magnetic metal.

Rejections under 35 U.S.C. § 103

Claims 136-37 were rejected as allegedly obvious based on Kaye et al. in view of Wu, Hasegawa, Hungerford, and Kauver, further in view of Zhou, et al.

For the reasons discussed above, the combination of Kaye and Wu fails to disclose or suggest the invention as claimed. Zhou is said to disclose "a biochip to detect manipulation of micro-particles and biological materials for economy and time-saving purposes." This clearly fails to overcome the above-described deficiencies of Kaye and Wu. Those references fail to disclose or suggest a patterned layer of magnetic material in a microdevice.

The claimed device includes both a patterned magnetic material and a photorecognizable coding pattern, and the combination of these features provides an advantage that could not have

been foreseen from the cited references. Thus even if a *prima facie* case for obviousness were provided, which the Applicant does not believe has been done because none of the references suggest the metal layer or a patterned magnetic material, this nonobvious advantage of the claimed device would rebut it and support a conclusion that the claimed invention is not rendered obvious by Kaye and Wu, or any of the additional cited references. The obviousness rejection should thus be withdrawn.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue. If it is determined that a telephone conference would expedite the prosecution of this application, the Examiner is invited to telephone the undersigned at the number given below.

In the event the U.S. Patent and Trademark office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to Deposit Account No. 03-1952 referencing docket no. 471842000500. However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

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Respectfully submitted,

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